The Next Generation of Web Integration

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We're at a Cusp

- Somewhere in-between
  .com boom >> .bomb wake-up call >> future
  <2 years ago>   <NOW>   <2 years>
- The Web connected our minds, triggered our imagination
  - ► new products, companies & services
  - ► ...and visions of sugar plums & millions ($)
- Businesses survive only if they offer real value & real substance
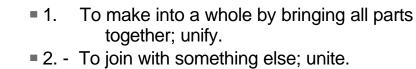 - ► an extension, an improvement, a real savings, an automation of something that exists
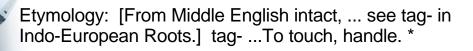
Survival of the Fittest

- In nature
  - ► new species didn't suddenly appear
  - ► they were continuations (with improvements)
- In business, the same applies
  - ► Not new companies, but new improvements
  - ► Old businesses with new faces
  - ► expand opportunities, reach, automation
- Best path of survival is to evolve
  - ► Grow from what was there
  - ► tie back to solid ground & value
- In a word..   INTEGRATE

Definition: In te grate

- 1.   To make into a whole by bringing all parts
         together; unify.
- 2. - To join with something else; unite.
      - To make part of a larger unit: integrated the new
         procedures into the work routine.
- 3.   To open to people of all races or ethnic groups
         without restriction; desegregate.
- 4.   Mathematics. To calculate the integral of. *
      a.   To perform integration on.
- 5.   Psychology. To bring about the integration of
         personality traits.

Etymology: [From Middle English intact, ... see tag- in
Indo-European Roots.] tag- ...To touch, handle. *

The First Wave of the Web

- Prior to the Web...
  - ► the Internet = collection of IP addresses
  - ► resonated with a few
- Add new ingredient: hypertext (Berners-Lee)
  - ► seed crystal in supersaturated solution->Lattice
- Why did it spread?
  - ► simple layer added to existing layer (ascii text)
    - − addition of english (description) to math
  - ► Extreme resonation with the way things are
  - ► Extensible, allowed freedom of coupling, ad hoc relationships, let it form itself....off it went!
- Changed the shape of the Internet
  - ► web of IP addresses -> web of documents

More on Evolution...

- Evolution creates diversity, intricacy
  "The world is heterogeneous & getting heterogeneous-er!"
- True with anything that evolves
  - ► nature, technology, language, business
- Nature as a model for technology
  - ► integration/interoperation = universal law
- Technology somehow forgot this
  - ► islands, fortresses, fiefdoms - no interoperation
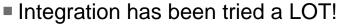 - ► even within two versions of the same product!

Why is Integration So Difficult?

- Software forms deep roots, hard to pull out
  - once used, built upon, relied on, ingrained
    - can't afford to disrupt, change
    - ain't broke, don't fix
  - Vendors liked this: lock-in
- Who's running who? Software or Business?
- Barrier to dynamic business
  - company A to company B
    - work out interoperation (EDI, etc.... 2 - 5 yr process)
  - now comes company C = better company
    - can't afford to connect!
- Technology = too rigid, too tightly coupled
  - lack of context, vision in design, math/precision

A History of Attempting Integration

- Integration has been tried a LOT!
  - ISO Model, DCE, CORBA, OpenDoc
- Protocols & APIs & Object Models
  - Too rigid, too big, too slow, too long!
- One-off integrations to most-used/popular
  - word->wordperfect, SAP->Baan
  - Ma&Pa->BigCorps (de facto standards)
- Some companies have died for not integrating
  - WordPerfect (wrong horse: OS/2)... dot bombs!
- Or been reprimanded for not
  - Attempts at homogeneous
    - AT&T, IBM.....Microsoft
- "No man is an island" -> No company either!

A Changed IBM

"Market control is no longer a sensible or an achievable business goal. No technology company can any longer dream of coming up with the magic bullet that will establish it …as a sole owner of a key platform.

We're not managing IBM—or investing its resources—in the expectation of, or hope for, that kind of control. Instead, we're building an enterprise that will thrive in a more complex, interdependent and open world."

– Lou Gerstner, 1999 IBM Annual Report
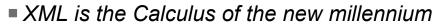
Open Standards Unlock Opportunity

"Proprietary standards often lock solution providers and their customers into one vendor's technology. Open standards allow for the use of technology from many different vendors."

- CRN, 2001/2/23

XML: the Key to Integration!

- *XML is the Calculus of the new millennium*
- In<tag>ration: inserting english in math
- Allowed for universal description of *anything*
  - ▶ *extensible, language factory*
- *Enabling the second wave of the web*
  - ▶ *Integration possible = real business value*
    - ▬ *my PO's "address" = your PO's "addr"*
- *Modern day Tower of Babel*
  - ▶ *Proliferation of languages, vocabularies, *ML's*
  - ▶ *e-Marketplaces = conversations*
- *Business is the main driver*
  - ▶ *e-Business, B2C, B2B all the rage!*

The Second Wave of the Web

- XML has resonated wildly in world of documents: the world of "nouns"
- But if it can describe anything, why not describe the infrastructure itself?
  - ▶ describe execution environments
  - ▶ Tag the verbs! (APIs, object models, RPCs)
  - ▶ map our processes & programs to each other
- This is where interoperation has not worked!
- Allow for loose coupling
  - ▶ symmetric tight coupling took too long
  - ▶ instead of 5 - 10 yr cycle, now weeks, months
- Don't pull out software, redress it, connect it

The Next Frontier: Web Services!

- The next wave: Application Integration
  - Instead of linking documents together, link programs and processes!
- Model it after the first wave
  - get the model right (resonate with real world!)
  - simple protocols (like HTTP, HTML)
  - ubiquitous implementation
    - IBM catalyzing with Open Source
- Whole new dimension to the web!
  - if a web of inter-linked documents was powerful
  - imagine a web of inter-linked programs!!
  - Automation is reborn!
- Inter-linked companies = inter-linked logical machines

Web Services Overview

- What is a web service?
  - any program that can link to another program across the web in a platform/language/object model independent fashion (using standard web service protocols)
- Let's look at a few examples on the web
  - xmethods.com
- Primate web services
  - stock quotes, weather forecasts, maps
  - round pegs in square holes
    - old integration problem: vendor lock-in
- Web Service protocols allow for loose coupling
  - plug-n-play, polygon pegs in polygon holes
  - frees up businesses to be dynamic, free-forming!

The Web Service Protocols

- IBM & Microsoft join forces!
  - ► Started last year
  - ► Reverberated across the planet...
- SOAP
  - ► Simple Object Access Protocol
- WSDL
  - ► Web Services Description Language
- UDDI
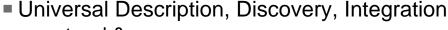 - ► Universal, Description, Discovery Integration

SOAP in a nutshell

- XML as RPC?
  - ► lots of individual ah-ha's (still goes on)
  - ► Userland: XML-RPC; Microsoft notices...
- SOAP: Simple Object Access Protocol
  - ► IBM notices, joins & leads with implementation
    - − SOAP4J now with Apache (just like Xerces)
- Off to W3C it goes!
  - ► XML Protocol working group formed
    - − chaired by David Fallside of IBM
- Update: ebXML has agreed to adopt SOAP

UDDI in a nutshell

- Universal Description, Discovery, Integration
  - ▶ protocol & org
  - ▶ 3 founders -> 30+ at announce
    - – now over 200 companies
- Free web-wide Business Registry
  - ▶ register businesses as white page entries
  - ▶ under yellow pages categories
  - ▶ *also* list web services so software can automate the integration between e-Businesses!!
- Distributed (like DNS)
- Three phases of development, then -> Stds

WSDL in a nutshell

- Web Services Description Language
  - ▶ an XML dialect/vocabulary to describe the web's "verbs", interfaces, APIs, processes
  - ▶ the "Braille" for programs to understand the shape of other programs
- Wrap existing software, regardless of language
  - ▶ keep results in UDDI
  - ▶ ... or right on your web page
- Update: sent to W3C in March 2001
- Tool vendors will automate process
  - ▶ auto-inspection of current components
    - – IBM's WSDE kit for Java on AlphaWorks
    - – Microsoft Studio.net for VB, other languages...

"Coopetition": Grow the Pie

- "The network effect"
- Very large snowball to begin with
  - ▶ IBM & Microsoft: SOAP->UDDI
- All the major vendors have announced plans around Web Services
- Cooperate on Standards, Compete on Implementations
- The leader in both: IBM

What is IBM's Web Services Strategy?

- Build on IBM's e-business strategy
- Provide industry leadership in the creation of Web services standards
- Enable software platform and tools to support development, deployment, and management of Web services
- Help customers and business partners take advantage of Web services to grow their business

How We Differentiate?

- Cooperate on standards, Compete on Implementations
- Unparalleled standards leadership
- Lead with implementations
  - alphaWorks, preview technologies, products
- Catalyze with Open Source
  - Apache, Linux
- Lead in bridging Java (still best server-side execution) to rest of world
- We have more of the existing world to integrate to
  - CICS, IMS, MQ, etc

Provide best of breed support for Web services

- **Today**
  - **Web Services Toolkit on alphaWorks**
  - **Web Services Development Environment**
  - **WebSphere Technology for Developers (TD)**

- **Later this year**
  - **WebSphere Studio**
  - **WebSphere Business Components**
  - **DB2**
  - **MQ Family support for SOAP**
  - **Tivoli Web Services Manager**
  - **Lotus Domino**

e-Business Still Means Business

- Lack of "Business" value is the key reason for the .com slowdown
- IBM has a LONG history of using technology to automate business
  - "Business" is our middle name
- We envision a world of businesses that are inter-linked across the web
  - documents & programs/processes
- If every business is seen as a "business machine"
  - we envision a world of
    - integrated business machines
- Our motivation is clear:
  - Bigger Market to sell Hardware, Software & Professional Services into

Web Services: Summary

- Web services is an e-business evolution
  - describe, discover, integrate services
  - increase market reach, syndicate assets, decrease connection costs, speeds the automation of processes
  - In a word: Integration!
- Open standards are required now more than ever
  - Open Source will also play a catalytic role
- IBM leading in the adoption of emerging standards
- Get started now with IBM
  - WebSphere Technology for Developers (TD) is leader
  - Web Services Toolkit & Web Services Development Env.
  - jStart Web services consulting
    - Partnerships with the early adopters

References

- ibm.com.alphaworks
  - ► site for free emerging tools and technologies from IBM
- ibm.com.developerworks
  - ► "the" place to go for resources, communities and updates on Web Services and XML for developers
- xml.apache.org
  - ► open source XML tools from Apache Software Foundation
- www.w3.org
  - ► World Wide Web Consortium site (Tim Berners-Lee & gang)
- uddi.org
  - ► Universal, Description, Distribution Integration consortium
- xmethods.com& xmltoday.com
  - ► news on SOAP services

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